We claim:

1. In a process for separation of a gas stream containing methane, C_2 and heavier hydrocarbon components into a volatile residue gas fraction and a relatively less volatile fraction containing said C_2 components and heavier hydrocarbon components, in which process;

   (a) the feed gas is cooled in one or more heat exchangers and then directed to a separator providing thereby a first residue vapor and a first liquid which contains C_2 and other lighter and heavier hydrocarbons; and

   (b) a first part of the first liquid containing C_2 is directed into a heavy-ends fractionation column wherein said liquid is separated into a second residue containing lighter hydrocarbons and a liquid product containing C_2;

   the improvements comprising;

   (1) cooling said second residue to partially condense it;

   (2) cooling a second part of said first liquid containing C_2 from (b) and combining the same with said partially condensed second residue stream from (1) resulting in a third liquid stream and a third residue vapor;

   (3) dividing said third liquid produced in step (2) into first and second parts;

   (4) further cooling said first part of said third liquid;

   (5) directing said second part of the third liquid to the heavy-ends fractionation column;

   (6) intimately contacting at least part of said first residue vapor with said cooled first part of third liquid from step (4) in at least one contacting stage and thereafter separating a fourth residue vapor and fourth liquid containing C_2 from said contacting device;

(7) supplying the fourth liquid thereby recovered in step (6) above to a heat exchanger for heating the same and thereafter into the heavy-ends fractionation column as a feed thereto;

(8) recovering as product the combined heated third residue vapor and the fourth residue vapor;

(9) recovering as product the second liquid stream from the heavy-ends fractionation column.

2. The improvement according to claim 1 wherein said contacting step (6) is carried out in a light-ends fractionation column that includes fractionation means for vapor/liquid counter-current contact and;

(i) wherein said cooled first part of the third liquid is introduced into said light end fractionation column above said fractionation means, whereby the cooled first part of the third liquid passes downwardly through said fractionation means;

(ii) supplying at least part of the first residue vapor to said light-ends fractionation column below said fractionation means, whereby the first residue vapor rises through said fractionation means in counter-current contact with the cooled first part of the third liquid.

3. The improvement according to claim 2 wherein the fractionation means in said light-ends fractionation column provides the equivalent of at least one theoretical liquid-vapor equilibrium stage arranged to contact at least part of said first residue vapor with the cooled first part of the third liquid stream.

4. The improvement according to claim 1 including the step of cooling the first part of the third liquid from step (3) prior to delivery of the same to the light-ends fractionation column.

5. The improvement according to claim 1 including the step of cooling the second part of the first liquid from (b) prior to combination of the second part of the first liquid with the partially condensed second residue stream from step (1) above.

6. An apparatus for separating a feed gas containing at least methane, C_2 components and heavier components into a fraction containing a predominant portion of the methane and lighter components and a fraction containing a predominant portion of the C_2 and heavier components, comprising:

   (a) a separation means for receiving feed gas and for providing a first residue vapor and a first liquid containing C_2 which liquid also contains lighter hydrocarbons;

   (b) a heavy-ends fractionation column means connected to receive a first part of said first liquid containing C_2, the heavy-ends fractionation column means being adapted to separate the first liquid C_2 into a second residue containing lighter hydrocarbons and a second liquid containing C_2 product;

   (c) a light-ends fractionation column means connected to receive at least part of said first residue vapor and at least part of the cooled first part of the third liquid to commingle said vapor and liquid in at least one contacting stage, and including the separation means for separating the fourth vapor and fourth liquid after contact in said stage, and being further connected to supply, via heat exchange, the fourth liquid separated therein to said heavy-ends fractionation column as a feed thereto.

7. The apparatus according to claim 6 wherein said light-ends fractionation column includes fractionation means for counter-current vapor-liquid contact and wherein said light-ends fractionation column is connected to receive said first residue vapor therein below said fractionation means and to receive the cooled first part of the third liquid above said fractionation means, said fractionation means thereby being adapted so that the first residue vapor rises there-through in counter-current contact with said cooled first part of the third liquid.